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स्वचल वाहन — संदर्भ आयतन — यात्री कारों के सामान का डिब्बा — मापन की पद्धतियां

Indian Standard

AUTOMOTIVE VEHICLE — REFERENCE VOLUME — LUGGAGE COMPARTMENT OF PASSENGER CARS — METHOD OF MEASUREMENT

UDC 629·11·042·2

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1993 **Price Group 3**

Automotive Body and Chassis Sectional Committee, TED 6

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Body and Chassis Sectional Committee had been approved by the Transport Engineering Division Council.

In the preparation of this standard assistance has been derived from ISO 3832.2 'Luggage compartment of passenger cars — Method of measuring the reference volume' published by the International Organization for Standardization and JASO Z 109 'Method of measuring reference volume for luggage compartment of passenger car' published by the Japan Automobile Standards Organization (JASO).

This standard is an important adjunct to IS 9226 : 1979 'Recommendations for load distribution for passenger cars'.

This standard aims at:

i) clear indication of masses of unit modules,

ii) the leg room between seats is eliminated from the effective volume of a luggage compartment,

iii) clear specification of the volume where stoppers are provided for rear seats, and

iv) handling of partition boards.

Methods of measuring the volume of a luggage compartment are based on the following concepts:

i) In order to ensure accurate measurement of actual volume, unit modules with the smallest possible size should be used.

ii) Several kinds of unit modules shall be used for practical purposes.

VDA West Germany (Verband der Automobile Industry) method is based on the former concept, while the US SAE method is based on the latter concept.

This standard is based on the ISO 3832.2 method which is internationally recognized, but following particular features are evident in the ISO method since unit modules are of only one type (suitcases):

i) Measurement is easy, and fluctuations that may be caused by the way of loading modules are little.

ii) Because of the bulky size of unit modules, ineffective volume is greater for small passenger cars, light motor vehicles and the ratio between the ineffective volume and the effective volume is also high.

iii) Evaluations in relation to larger luggages such as golf bags, ice boxes, etc, are difficult.

However, it has been found necessary that auxiliary unit modules of half the size of the ISO module shall also be added in the measurement of luggage volume.

The reasons to add the unit modules of the half size are:

a) The downsizing of the passenger cars has occurred and the production of small sized passenger cars has increased to improve fuel economy in these days. The room space and the luggage compartment of the small size passenger cars should be measured more accurately.

b) There are many luggages which are smaller in size than the unit module specified in ISO 3832·2. Therefore, there is need for small size modules, to evaluate the space practically. However, it is not necessary to choose very small modules and it is found that the modules of half the size of ISO module can be used effectively to measure the volume of luggage compartment.

(*Continued on third cover*)

Indian Standard

AUTOMOTIVE VEHICLE — REFERENCE VOLUME — LUGGAGE COMPARTMENT OF PASSENGER CARS — METHOD OF MEASUREMENT

1 SCOPE

This standard specifies the methods of measuring the reference volume for luggage compartments of passenger cars.

2 REFERENCE

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
9211 : 1979	Denominations and definitions of weights of road vehicles
13749 : 1993	Method of test for determination of H-point for road vehicles

3 DEFINITIONS

For the purpose of this standard the following definitions shall apply.

3.1 Reference Volume of a Luggage Compartment

The volume of a luggage compartment as determined by the standardized measuring method in order to allow comparisons among passenger cars.

3.2 Unit Modules

Luggage loaded in the luggage compartment of a passenger car for the measurement of the volume of the compartment.

3.3 R Point

The seating reference point defined in IS 13749 : 1993.

3.4 Luggage Compartment

The portion divided from the rest of the vehicle for loading luggages. It contains, however, a space created by moving rear seats or rear seat backs so as to increase the volume of the luggage compartment.

4 UNIT MODULES

4.1 Unit modules shall be rectangular parallelepiped with their corners rounded by 10 mm or less, and the length of each side and the mass as given in Table 1.

4.2 Unit modules shall not get deformed when loaded into the luggage compartment according to the method specified in 6.

5 MEASURING METHODS

5.1 In case of a Closed Luggage Compartment not Connected Directly to the Passenger Compartment (Closed Luggage Compartment):

a) Spare parts and tools (spare tyres, jacks, etc), which are provided to be accommodated into the luggage compartment, shall be installed at locations specified by the manufacturers.

b) Fill as many standard unit modules into the luggage compartment as possible. Under the laden condition, the unit modules shall not impede the proper closing and locking of trunk lid.

Table 1 Specifications of Unit Modules

(*Clause* 4.1)

Type of Unit Modules / Shape		Standard Unit Modules	Auxiliary Unit Modules		
			A Type	B Type	C Type
Dimensions in mm	Length (mm)	400 ± 4·0	400 ± 4·0	200 ± 2·0	400 ± 4·0
	Width (mm)	200 ± 2·0	200 ± 2·0	200 ± 2·0	100 ± 1·0
	Height (mm)	100 ± 1·0	50 ± 1·0	100 ± 1·0	100 ± 1·0
Mass (kg)		1·5 or less	1·0 or less	1·0 or less	1·0 or less

c) Fill auxiliary unit modules into the space of **5.1**(b) above as many as possible. At this time, the number of the standard unit modules shall be the same as in the case of **5.1**(b) above. Under the laden conditions, the unit modules shall not impede the proper closing and locking of trunk lid. The trunk lid of the luggage compartment shall be normally closed and locked under laden condition.

5.2 Measurement of the Luggage Compartment Open to the Passenger Compartment

If the vehicle is so constructed that the rear seats or rear seat backs can be folded or removed so as to obtain maximum loading volume, the volume shall be measured under the following two types of conditions:

1) When the rear seats and back are in the normal position for seated passengers; and
2) When the rear seat and/or back are so folded or removed that the volume of the luggage compartment becomes the maximum.

5.2.1 *Measuring Conditions*

a) *Upper Limit* — The horizontal plane 400 mm above the R point of driver's seat.

NOTE — The horizontal plane means the horizontal plane under the maximum loaded conditions specified in IS 9211 : 1979.

b) *Front Limit* — The vertical plane through the backs of the seats situated immediately in front of the luggage compartment, set at their rearmost and lowest position, with the attaching angle between the seat backs and the seat cushions is set at the standard angle intended by the designer (*see* Fig. 1).

NOTE — The forward portion from the stopper shall not be considered as a luggage compartment, when the rear seat backs are folded forward but there is such a stopper to protect passenger (*see* Fig. 2).

c) The internal fitting of the luggage compartment shall be as planned by the manufacture (spare wheel, jacks, etc).

d) Detachable partition boards may be removed, provided that they shall be installed at locations specified by the manufacturers, or in the luggage compartment.

e) The leg room between the front seats and rear seats shall not be deemed as a part of the luggage compartment.

5.2.2 *Measuring Procedure*

a) Fill the luggage compartment with the largest possible number of standard unit modules. Under the laden condition, the unit modules shall not impede the proper closing and locking of the trunk lid or the rear door of the luggage compartment.

b) Fill the remaining space of the luggage compartment with the largest possible number of auxiliary unit modules. At this time, standard unit modules shall be loaded in the same number as in the case of **5.2.2** (a) above.

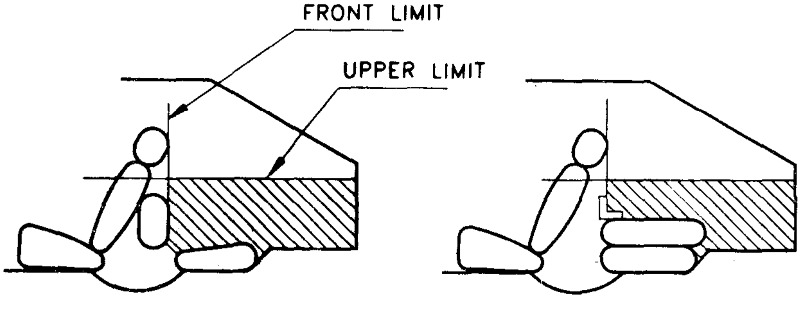


FIG. 1 RANGE OF LUGGAGE COMPARTMENT

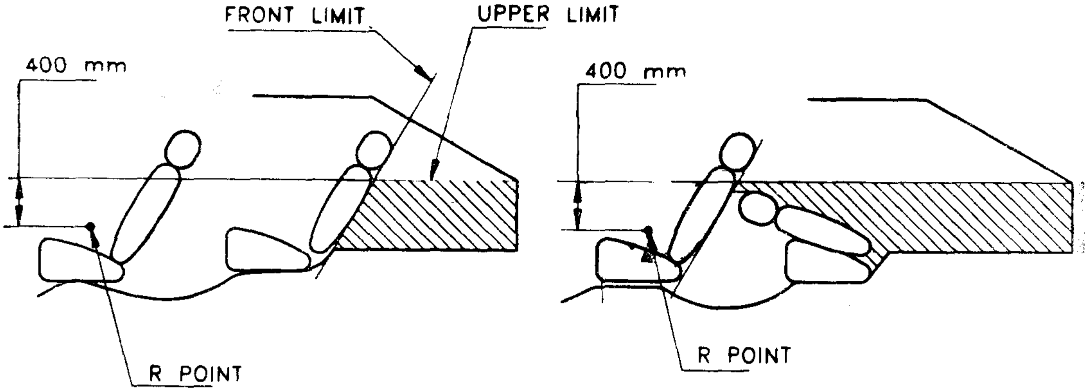


FIG. 2 RANGE OF LUGGAGE COMPARTMENT

Under the laden condition, the unit modules shall not impede the trunk lid or the proper closing and locking of rear door or trunk lid of the luggage compartment.

6 REFERENCE VOLUME OF A LUGGAGE COMPARTMENT

It shall be the sum total of the volumes of unit modules which may be introduced into a luggage compartment according to the method specified in 5 and it shall be calculated by the standard dimensions of the length, width and height given in Table 1 (*see* **4.1**).

Table 2 Different Methods of Measuring Volume of Luggage Compartment
(*Foreword*)

Unit Modules	Type of Luggage
Standard unit modules	Suitcase
Auxiliary unit modules (A)	Triangle indication board, white-shirt case, confectionary box and tool box
Auxiliary unit modules (B)	Water bottle, tissue paper box and confectionery box
Auxiliary unit modules (C)	Shoe box and liquor bottle box

Due to the fact that seats are often deflected when unit modules are mounted on them, the upper limit of the masses of unit modules has been specified.

A to C = Passenger cars with closed luggage compartments

D, E = Passenger cars with open structured luggage compartments to passenger compartments

F, G = Light motor vehicles with closed luggage compartments

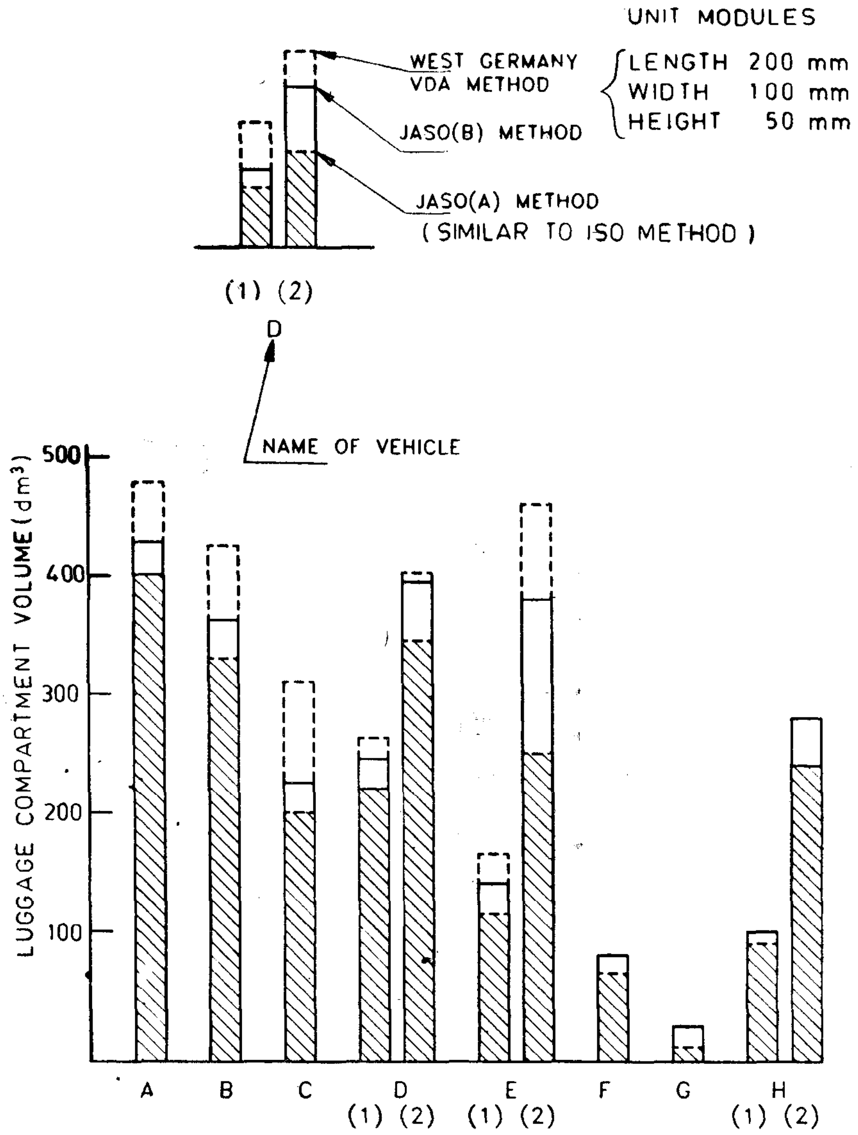
H = Light motor vehicle with open structured luggage compartment

Unit modules of ½ size are added so as to approximate measured volumes to actual volumes.

A comparative statement is shown in Table 3 providing difference between ISO, SAE and JASO practices.

Table 3 Comparison of Standard of Luggage Volume of Measurements Methods
(*Foreword*)

Standard No.	JASO Z 109 (Japan)	ISO 3832 (ISO)	SAE J 110 a (USA)
Field of Application	Passenger Cars	Passenger Cars	Passenger Cars
Shape of unit modules	(Standard unit modules) 400 × 200 × 100 (Auxiliary unit modules) ½ size of Standard unit	400 × 200 × 100	Suitcases (7 kinds) 610 × 482 × 229 325 × 152 × 114 and golf bags
Mass of unit modules	1·5 kg or less (1·0 kg or less for auxiliary unit modules)	Not specified	Not specified
Loading conditions i) Upper limit	i) (R + 400) mm	i) (R + 400) mm	i) and ii) are not specified as follows:
ii) Front limit	ii) The plane along the seat back rear surface. If there are stoppers, the rearward portion from stoppers	ii) The vertical plane through the seat back (identical to JASO)	The upper limit = Seat back height + 2 in
iii) Leg room between	iii) The leg room is not deemed as a luggage compartment	iii) Not specified	iii) Not specified
Maximum loading mass	No. of passengers × 55 kg (Passenger compartment)	No. of passengers × 68 kg (Passenger compartment) No. of passengers × 7 kgs (luggage compartment)	No. of passengers × 60 kg (Passenger compartment) Design value (luggage compartment)



NOTE — F, G and H, West Germany VDA Method is not used in Measurement.

FIG. 3 LUGGAGE COMPARTMENT VOLUMES AS MEASURED BY DIFFERENT METHODS

ANNEX A

(*Foreword*)

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Printed at Paragon Enterprises, Delhi, India